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ABSTRACT

The purposes of this study were: (1) to test several social decision schemes to obtain plausible explanations of different group processes in solving different disjunctive tasks; and (2) to study both dyads and tetrads solving a eureka and a non-eureka disjunctive task. Social decision schemes theory assumes that a group decision is a joint function of the distribution of individual member preferences and the scheme that operates on this distribution. This study assumed that there is one distribution for solving a eureka disjunctive task and another for solving a non-eureka disjunctive task. Swedish fourth and fifth grade students were randomly assigned to different group sizes (one, two, or four). Thirty-two replications were performed for every experimental condition. The results indicated that different processes are created by different tasks. (Author/BW)

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Social Decision Schemes of the Same Dyads and Tetrads on Two Different Disjunctive Tasks

Thor Egerbladh

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Abstract

Subjects were 224 ten- and eleven-year-old pupils who were studied in a 2 X 3 (Types of Problems X Group Sizes 1, 2 and 4) factorial design. One type of problem was a priori thought to be eureka and the other non-eureka disjunctive. Nine social decision scheme models were tested as theories of the underlying group processes. Different processes were created by different types of problems so that the truth-wins and the truth-supported wins models provided the best fit for eureka, whereas the strict equiprobability and the strict proportionality models unexpectedly gave the best fit for non-eureka tasks. Item by item analyses showed, however, that only six out of ten non-eureka items de facto resulted in disjunctive processes whereas four non-eureka items resulted in conjunctive processes. An a posteriori social decision scheme proved, moreover, to give the clearly best fit across all items for eureka tasks and tetrads and a significant Type of Problem X Group Size interaction ($p<.01$) provided further support for the assumption of the importance of the type of problem for the group process in different group sizes.

Social Decision Schemes of the Same Dyads and Tetrads on Two Different Disjunctive Tasks

Many experiments have been performed recently within the individual versus group paradigm by using the social decision schemes approach (e.g., Davis, Kerr, Sussman, & Rissman, 1974; Johnson & Davis, 1972; Laughlin & Bitz, 1975; Laughlin, Kerr, Davis, Halff, & Marciniak, 1975; Laughlin, Kerr, Munch, & Haggarty, 1976). But, generally, only one type of task has been studied in one and the same experiment which may be considered a flaw, among other things regarding the possibilities of mixing tasks and subjects in a comparison of different experiments. The only exception seems to be Laughlin et al (1976). They used two different tasks: (a) A eureka disjunctive and complementary task, that is, the Remote Associates Test (Mednick & Mednick, 1967) and, (b) a non-eureka disjunctive and complementary task, that is, the Otis-Quick-Scoring Mental Ability Test (Otis, 1954) on high-, middle-, and low ability groups of four persons and, by using the social decision schemes theory (Davis, 1973), they were able to show that different group processes were established by different tasks.

As far as is known no educational or psychological experiment has, however, been reported where the effects of more than one type of task has been studied on the same groups of different sizes.

One aim with this experiment was therefore to, in addition to tetrads, also study dyads solving a eureka disjunctive and a non-eureka disjunctive task. This was considered to be important, since it is reasonable to assume that different processes are created in different group sizes depending on the possibilities of interaction.

Studies within this field have generally been performed on American high school or college students. It was therefore of interest to make a cross validation of earlier results on subjects from another population. This experiment was performed on 10- and 11-year-old Swedish pupils.

Steiner (1972) has, in his theory of group process and productivity, postulated that different disjunctive tasks can result in different degrees of process losses, which in their turn may create different processes in different group sizes (cf. also Shaw, 1976, ch. 3). The main purpose of this experiment was therefore to test several social decision schemes or models (cf. Davis, 1973; Laughlin et al. 1975) in order to obtain plausible explanations of these group processes. Two types of tests were also planned in order to be able to present a reliable and informative analysis (cf. Kerr, Stasser, & Davis, 1979): (a) Each model across all items, and (b) Each model on each item.

The general assumption of the social decision schemes theory (Davis, 1973) is that the group decision is a joint function of the distribution of the individual member preferences and the social decision scheme that operates on this distribution. More specifically, the first statement of the theory is based on the assumption that there is an individual probability distribution of preferences in a population. This probability distribution characterizes the preferances of the individuals. In this study it is assumed that there is one distribution of the individual preferences for solving a eureka disjunctive task and another distribution for solving a non-eureka disjunctive task. More generally, a row vector of the individual probability distribution of preferences is determined from the multinomial expansion using the probability of each of the individual responses as estimated from either a measure of previous performance of the actual individuals who form the group or from an independent sample of individuals. This row vector of the individual probability distribution of preferences is postmultiplied by a social decision scheme matrix, that is, a group interaction model, to obtain a row vector of the predicted probability of the performance of the group. Finally, the predicted performance of the group is compared with the obtained group responses. If the predictions do not differ significantly from the obtained group responses, the social decision scheme model may be

considered a plausible explanation of the underlying group processes. Consequently, the group product is assumed to be equivalent to a multiplicative relationship between (a) the estimated vector for the individual preferences and (b) the social interaction in the group defined from a certain social decision scheme model.

The social decision schemes tested by Laughlin et al (1975) and Laughlin et al (1976) were also tested in this experiment. (The DEST-model estimated from Laughlin and Branch (1972) for different ability groups was not suitable for the design used in this experiment). The schemes were as follows: (a) strict equiprobability; (b) strict proportionality; (c) truth wins; (d) truth-supported wins; (e) majority, equiprobability otherwise (a subscheme of equiprobability was applied when there was no majority); (f) majority if correct, equiprobability otherwise; (g) majority if incorrect, equiprobability otherwise; (h) error wins; and (i) error supported wins. Further details on the underlying theory, plausible intuitions or baseline assumptions formalized in each of the nine models and the larger social decision scheme approach are given in Laughlin et al (1975) and Davis (1973).

Method

Subjects

Two hundred and twenty-four 10- and 11-year old Swedish pupils from Grades 4 and 5 were assigned randomly

to group size one, two, and four. Thirty-two replications were performed for every experimental condition. The experiment was run in the pupils' ordinary classrooms.

Material

The eureka disjunctive and complementary task consisted of ten meaningful anagrams, for example, PLUM-LUMP. The anagrams were constructed according to a psychometrical method reported by Henryssen (1971, pp. 130-145). The task difficulty varied between $\underline{p}$ = .22 and $\underline{p}$ = .77.

Also following Henryssen (1971) the non-eureka and complementary disjunctive task was constructed so that it provided the pupils with an opportunity of understanding and learning unknown words. Each separate task (each item) had a short preamble where the unfamiliar word was underlined and used in its proper context. The preamble was followed by three statements. The unfamiliar word occurred in each of these statements but it was used in its proper meaning in only one of them. The pupils were asked to judge the correct alternatives. The following is an example of a non-eureka disjunctive item: If there is one thing Charley cannot stand, it is school. He hates everything which has to do with school. Both his parents and his teachers are very worried about Charley's aversion to school. (a) Charley often showed signs of aversion when he occupied himself with his hobby. (b) Aversion is a way of lear-

ning to behave in school. (c) Peter disliked very much to take part in any kind of sport which, according to his sister, was very strange since she did not share this aversion to sport. (d) Peter's parents were worried since Peter did not have aversion enough to cope with school.

During the standardization of the task (the ten items) great care was taken to make sure that the "new" words really were unfimilier to the pupils and less than one percent of the pupils in the last sample (n = 93) recognized one or two of the new words. The task difficulty varied between $\underline{p}$ = .28 and $\underline{p}$ = .82.

Design and procedure

The experimental design was a 2 x 3 mixed design with 32 replications per cell. The two factors varied were Type of Problem (eureka and non-eureka disjunctive tasks) and Group Size (one, dyad, and tetrad). Type of Problem was a within-groups factor with repeated measures on the same factor and Group Size was a between-groups factor. Three practice eureka and non-eureka disjunctive items were given to the pupils. Same-sex groups were used, and all groups were placed at two desks standing adjacent to each other. Approximately half of the groups consisted of boys and girls, respectively. Every group selected one member to write or mark down the answers. Then every pupil was given a separate test. The dyads and tetrads were instructed to cooperate. The individuals were instructed to work alone, and all pupils were

instructed to do their best and to give the right answer as quickly as possible. Interaction between groups was not observed by the experimenters, but some kind of overhearing can, of course, not be completely excluded. At first, approximately half of the groups (1, 2, and 4) in a class worked on one type of task. The items were then collected and the groups were now given the type of task which they had not previously worked on. Fifteen minutes was devoted to each type of task.

Results and Discussion

Analysis of variance

A 2 X 3 (Types of Problems X Group Sizes 1, 2, and 4) analysis of variance was performed on number of correct items. The Type of Problem X Group Size interaction was significant, $F(2,285) = 10.09$, $p < .01$. The main effects of type of problem and group size were, however, not significant, $F(1,285) = .92$; $F(1,285) = .82$.

Post hoc tests were performed for differences between group size (1, 2, and 4). Significant differences between all group sizes ($p < .01$) were obtained for eureka disjunctive tasks, that is, dyads performed better than individuals and tetrads performed better than both dyads and individuals. No significant differences were obtained for non-eureka disjunctive tasks and different group sizes.

Each model across all items

Summing over the ten eureka and non-eureka items respectively the prediction of group performance was made from the mean number of individual responses. As in the study by Laughlin et al (1975) the z statistic was used to test the difference between predicted and obtained probabilities. The results are presented in Table 1. A significant z value indicates that a given model can be rejected as a plausible explanation of the underlying group processes. In order to obtain a conservative test of sufficient statistical power to essentially accept the null hypothesis all z values were assessed by two-tailed tests at the .10 level of confidence (cf. Laughlin et al., 1975, pp. 490-491). It should also be noted that the lower the z value the better the fit of the prediction of an actual model.

Insert Table 1 about here

The clearly best fit is provided by the TWIN-model (and by definition by the ESWIN-model) for dyads solving eureka disjunctive and complementary tasks. All other models are rejected in this relation. This result is generally consistent with earlier investigations of this type of task and group size (cf. e.g., Davis, 1969, Ch. 3; Laughlin et al., 1975). This statement

is also relevant for different degrees of difficulty of disjunctive and unitary tasks. (cf. Bray, Kerr, & Atkin, 1978).

The results for tetrads is consistent with Laughlin et al. (1976) in the respect that the best fit is obtained regarding the TWIN-model. The results for tetrads can, on the other hand, hardly be given a satisfactory explanation on the basis of this model in this experiment since z equals 1.88 ($z=1.65$, $p< .10$). However, an interpretation may be that subgroups can be formed in a tetrad. One correct decision may be made by two of the members and another correct decision may be made by the two other members. This fact can make it more difficult for the group as a whole to make a rational decision. Or stated otherwise: The task may be "eureka disjunctive" in the subgroups but not in the group as an entity.

Regarding non-eureka disjunctive tasks a completely different pattern is obtained in at least two respects: (a) Other models than the TWIN-model provide plausible explanations of the outcome. (b) With the exception of the ESWIN-model and tetrads the same models provide a good fit for both dyads and tetrads. This points to the fact that different processes can be created by different types of disjunctive tasks. The processes also seem to be comparable for dyads and

tetrads regarding non-eureka disjunctive and complementary tasks. An additional analysis of the empirical results also shows that means for individuals, dyads, and tetrads were 6.38, 6.50, and 6.38, respectively. Since a good fit is given for the STEQ, STPR, and MAEQ-models, this is a reasonable result per se. The results for dyads and tetrads are, on the other hand, not expected since the task (various items) can be assumed to have a disjunctive or at least a quasi-disjunctive character. Different items can moreover be assumed to be complementary. The groups can thus, on the basis of the above assumptions, be expected to perform better than the individuals (cf. also Steiner, 1972 and Egerbladh, 1976). A task is, however, not a disjunctive task only by definition but rather by demonstration in a real group situation. Davis' methodology (Davis, 1973) can also, as has been suggested above, be used for defining the positions of individual items on the disjunctive-conjunctive dimension regarding group task characteristics. This is made in this study by testing each model on each item with the aid of a method used by Laughlin et al. (1975).

Each model on each item

The results for each model on each eureka disjunctive item are presented in Table 2. The z statistic is used for the same purpose as before.

Insert Table 2 about here

A good fit is obtained regarding the TWIN-model and dyads in nine cases (items) out of ten. This finding is consistent with Laughlin et al (1975), who found that the TWIN-model could be rejected only on 5 of 30 items for dyads solving the Remote Associates Test (Mednick & Mednick, 1967). These two experiments together thus provide strong support for the TWIN-model regarding (a) dyads, (b) eureka disjunctive and complementary tasks, and (c) samples from different populations.

The result for the tetrads is quite different from that of the dyads. A good fit for the TWIN-model is obtained for only half of the items. It can also be noted that the TSWIN-model provides a good fit for three of the five remaining items. A model built on a synthesis between the TWIN- and TSWIN-models should therefore provide a better explanation of the outcome.

The results for each model on each non-eureka disjunctive item are presented in Table 3. The z statistic is used for the same purpose as before.

Insert Table 3 about here

Part of the explanation of groups unexpectedly getting the "same" results as individuals can be seen in Table 3. This table shows that the results for some items (no. 4 and 8 for dyads and no. 1, 6, 7, and 9 for tetrads) are disjunctive, that is, the results can be explained by the TWIN- and TSWIN-models. The conjunctive models EWIN and ESWIN can of course also by definition provide "explanations" of the results for no. 4 and 8 but attention should above all be drawn to the conjunctive results for tetrads concerning no. 2, 3, 5, 8, and 10. An additional analysis of the empirical results for individuals, dyads, and tetrads also showed that six of the items (no. 1, 3, 4, 6, 7, and 9) had a disjunctive character throughout, whereas four of the items (no. 2, 5, 8, and 10) were of a conjunctive character throughout. (Proportions (p) for individuals, dyads, and tetrads for disjunctive items were .63, .70, and .73, respectively. Proportions for individuals, dyads, and tetrads for conjunctive items were .65, .58, and .51, respectively). A reasonable speculation regarding these results may be that the disjunctive items result in associations which to a large extent are connected with the pupils' cognitive structures regarding (a) the content of the text (b) the meaning of the new word, and (c) the different response alternatives or with some or some combination of these "factors". The group members thus gain a relatively good insight into the correct answers, which may be one

of the reasons that groups perform better than individuals. If this argument is reasonable, the opposite explanation should be plausible for the conjunctive items, that is, the character of these items does not have a "sufficient" degree of insight. One result of this may be that the pupil who, on logical grounds, finds out the correct answer will lose time when he or she is going to convince the other members in the group.

TWIN or TSWIN

The best fit for eureka disjunctive tasks and tetrads is thus given by the TWIN- and TSWIN-models. Neither of the models gives, however, from a statistical point of view a good fit across all items, i.e., the TWIN-model overpredicts and the TSWIN-model underpredicts the empirical result. Earlier research also points to large difficulties in finding sufficient empirical support for the TWIN-model when larger groups have been studied (cf. e.g. Davis, 1969, ch. 3).

One of the basic assumptions in the TWIN-model is that the probability equals $p=1.00$ that a group member who finds out the correct solution will be able to convince the other members in the group. When subgroups are formed it should, however, be more reasonable to assume strict equiprobability ($p=.50$) for the given

answer from a group member. Or in other words: The probability should rather be the same that the group will reject or ignore a correct solution as that it will accept it completely. The formation of subgroups is thus assumed to make it more difficult but not quite impossible to make a constructive decision. An analogy can be made regarding the TSWIN-model: The probability that an individual group member will succeed in convincing the others about the correct answer is here assumed to be zero ($\underline{p}$=.00). The same assumption regarding the importance of the subgroups can, however, be made in connection with this model, i.e., the probability can be assumed to be the same that a correct solution from one group member will be either accepted or rejected. A synthesis of the TWIN- and TSWIN-models can thus be defined by the following decision matrix where $\underline{p}$ corresponds to a correct and $\underline{q}$ to an incorrect solution: $\underline{p}$=1.00, $\underline{q}$=.00; $\underline{p}$=1.00, $\underline{q}$=.00; $\underline{p}$=1.00, $\underline{q}$=.00; $\underline{p}$=.50, $\underline{q}$=.50; $\underline{p}$=.00, $\underline{q}$=1.00. This model can, in analogy with previously reported models (e.g. Laughlin et al, 1975), be given the name "Truth-supported wins, equiprobability otherwise" and is abbreviated TSEQ. The corresponding model for conjunctive situations will thus be "Error-supported wins, equiprobability otherwise" and is abbreviated ESEQ. A posteriori test across all items of the TSEQ-model, eureka disjunctive and complementary tasks and tetrads resulted in z=-.66. It would therefore be of interest for further research to test the TSEQ- and ESEQ-models on disjunctive and conjunctive tasks, other group compositions and larger group sizes than triads.[1)]

Conclusions

The importance of studying more than one type of task on the same groups of different sizes has been demonstrated. The results clearly show that different processes are created by different types of tasks. Generally, the best fitting model across all items for dyad and tetrad performance on the eureka disjunctive task was the TWIN-model, while the best-fitting models on the non-eureka disjunctive task for the same groups were the STEQ, STPR, and MAEQ models. Item by item analysis gave, however, new ideas for the explanation of these latter unexpected results since it appeared that only six of the ten a priori non-eureka disjunctive items de facto had disjunctive characteristics, that is, groups performed better than individuals. Four of the ten a priori non-eureka disjunctive items had, on the other hand, conjunctive characteristics, i.e. groups performed worse than individuals. This was supposed to be a result of the associations, or lack of associations, that a certain item can be assumed to produce in relation to the cognitive structures of the pupils.

The item by item analysis of eureka disjunctive tasks showed that a good fit was obtained in nine cases (items) out of ten for the TWIN-model and dyads, which is consistent with earlier research with subjects from another population (cf. e.g. Laughlin et al, 1975). The result of the tetrads could, however, generally be explained on the basis of both the TWIN-model and the TSWIN-model. A combination of these models on the basis of an assump-

tion regarding the influence of subgroups on rational decision-making resulted in a third model, that is, "The Truth-supported wins, equiprobability otherwise model" (TSEQ). This model proved a posteriori to give the clearly best fit across all items for eureka disjunctive and complementary items and tetrads.

Davis' (1973) methodology thus makes it possible to analyze both across all items and item by item. One of the advantages of this has been demonstrated in this report, i.e. the possibility of defining the position of every individual item on the disjunctive-conjunctive continuum. This is a step forward since earlier studies generally have been restricted to one single task (one item) or to the mean of a number of items (cf. e.g. Davis, 1969; Kelley & Thibaut, 1969; Shaw, 1976). This problem has also recently been discussed within the framework of this approach by Schöneman (1979) and Kerr, Stasser & Davis (1979).

Further research should therefore be concentrated on (a) types of problems consisting of a number of separate items, (b) other group compositions, and (c) different group sizes aiming at increasing our knowledge of the interaction between type of task and group size.

Footnotes

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[1] There is also a provocative analogy with the concept of pairing in Bion's theory for groups solving therapeutic problems (Bion, 1961). He thinks that pairing in a group can be explained by a feeling on the part of the two members that they have the same leader, which can be assumed to facilitate the continued work of the pairing. This leader can be "real", but can also be represented by (symbolized by) a joint idea or a feeling of cohesiveness when the two members are confronted with a problem. The pair will thus, at least temporarily, isolate itself from the other members. The probability that one single member will carry through his or her suggestion of a solution in a larger group than dyads can therefore not be assumed to be $p=1.00$ except possibly for extremely easy and self-evident items, which has also recently been demonstrated by Bray et al., (1978). It is, on the other hand, not probable that these pairings will occur in all groups. The probability for one single member forcing through his suggestion of a solution should therefore not be totally neglected, i.e. be assumed to be $p=.00$.

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Table 1

Test of Significance (z^a) Between Predicted and Obtained Values for Each Model Across All Items for Eureka and Non-Eureka Disjunctive Problems Respectively

	Group size			
Case	2	4	2	4
model	Eureka disjunctive		Non-Eureka disjunctive	
STEQ	- 2.17	- 3.70	- .12	- .81
STPR	- 2.17	- 4.16	- .12	.00
TWIN	.71	1.88	2.99	5.68
TSWIN	- 5.15	- 2.45	- 2.75	2.94
MAEQ	- 2.17	- 4.50	- .12	.72
MCEQ	- 2.17	- 2.68	- .12	1.49
MIEQ	- 2.17	- 5.58	- .12	- 1.49
EWIN	- 5.15	-10.09	- 2.75	- 5.68
ESWIN	.71	- 6.72	2.99	- 1.15

Note. Abbreviations are as follows: STEQ = strict equiprobability; STPR = strict proportionality; TWIN = truth wins; TSWIN = truth supported wins; MAEQ = majority, equiprobability otherwise; MCEQ = majority if correct, equiprobability otherwise; MIEQ = majority if incorrect, equiprobability otherwise; EWIN = error wins; ESWIN = error supported wins.

[a] $z = 1.65$, $p < .10$; $z = 1.96$, $p < .05$; $z = 3.65$, $p < .001$.

Table 2

Test of Significance (z^a) Between Predicted and Obtained Values for Each Model on Each Item for Eureka Disjunctive Problems

Group size	Case model	Item 1	2	3	4	5	6	7	8	9	10
Two	STEQ	-2.66	-2.41	-2.68	-2.92	-2.13	-2.74	-2.86	-2.87	-1.58	.00
	STPR	-2.66	-2.41	-2.68	-2.92	-2.13	-2.74	-2.86	-2.87	-1.58	.00
	TWIN	- .36	.76	.42	- .01	.55	.34	- .10	-1.15	.54	1.77
	TSWIN	-3.77	-5.04	-5.44	-5.94	-5.25	-5.50	-5.94	-5.70	-4.59	-2.61
	MAEQ	-2.66	-2.41	-2.68	-2.92	-2.13	-2.74	-2.86	-2.87	-1.58	.00
	MCEQ	-2.66	-2.41	-2.68	-2.92	-2.13	-2.74	-2.86	-2.87	-1.58	.00
	MIEQ	-2.66	-2.41	-2.68	-2.92	-2.13	-2.74	-2.86	-2.87	-1.58	.00
	EWIN	-3.77	-5.04	-5.44	-5.94	-5.25	-5.50	-5.94	-5.70	-4.59	-2.61
	ESWIN	- .36	.76	.42	- .01	.55	.34	- .10	-1.15	.54	1.77
Four	STEQ	.38	-3.44	-3.89	-1.61	-5.04	-8.84	-4.37	-6.83	-3.23	-3.89
	STPR	.65	-2.86	-3.55	-1.79	-6.20	-7.58	-4.88	-8.12	-4.34	-5.15
	TWIN	3.26	3.13	2.53	4.21	.01	-1.63	1.00	-3.90	.37	-1.36
	TSWIN	3.26	.16	- .87	.18	-4.49	-4.87	-3.42	-8.78	-4.58	-5.97
	MAEQ	2.26	-2.15	-3.21	-1.96	-6.42	-7.04	-5.41	-9.76	-5.94	-6.84
	MCEQ	2.26	-1.27	-2.02	- .36	-4.07	-4.69	-3.47	-6.73	-3.03	-3.82
	MIEQ	- .38	-4.23	-4.91	-3.24	-7.24	-8.99	-6.39	-9.92	-6.22	-6.93
	EWIN	-6.67	-8.62	-9.48	-7.82	-11.57	-13.45	-10.83	-12.34	-9.42	-9.23
	ESWIN	1.80	-4.00	-5.25	-4.19	-8.65	-9.50	-7.48	-11.31	-7.89	-8.29

Note. STEQ = strict equiprobability; STPR = strict proportionality; TWIN = truth wins; TSWIN = truth supported wins; MAEQ = majority, equiprobability otherwise; MCEQ = majority if correct, equiprobability otherwise; MIEQ =

majority if incorrect, equiprobability otherwise; EWIN - error wins; ESWIN - error supported wins.

[a] $z = 1.65$, $p < .10$; $z = 1.86$, $p < .05$; $z = 3.65$, $p < .001$.

Table 3

Test of Significance (z^a) Between Predicted and Obtained Values for Each Model on Each Item for Non-Eureka Disjunctive Problems

Group size	Case model	Item 1	2	3	4	5	6	7	8	9	10
Two	STEQ	- .51	.00	- .37	-2.50	.00	- .39	- .77	2.15	- .31	.70
	STPR	- .51	.00	- .37	-2.50	.00	- .39	- .77	2.15	- .31	.70
	TWIN	2.33	2.83	2.71	.63	3.10	2.73	2.34	5.16	2.22	3.67
	TSWIN	- 2.32	-1.82	-3.04	-5.09	-2.37	-2.98	-3.36	- .76	-3.49	-2.26
	MAEQ	- .51	.00	- .37	-2.50	.00	- .39	- .77	2.15	- .31	.70
	MCEQ	- .51	.00	- .37	-2.50	.00	- .39	- .77	2.15	- .31	.70
	MIEQ	- .51	.00	- .37	-2.50	.00	- .39	- .77	2.15	- .31	.70
	EWIN	- 2.32	-1.82	-3.04	-5.09	-2.37	-2.98	-3.36	- .76	-3.49	-2.26
	ESWIN	2.33	2.83	2.71	.63	3.10	2.73	2.34	5.16	2.22	3.67
Four	STEQ	- 6.16	- .38	- .68	-1.98	- .68	-2.40	-2.40	2.75	.45	2.18
	STPR	- 4.36	.92	.00	-1.17	.38	-1.58	-1.58	2.92	- .31	2.18
	TWIN	- .12	5.15	5.58	4.58	5.83	4.17	4.17	8.95	5.30	8.22
	TSWIN	- 1.11	4.17	2.93	1.91	3.68	1.49	1.49	5.92	.59	4.36
	MAEQ	- 2.70	2.57	.70	- .31	1.57	- .72	- .72	3.09	-1.10	2.18
	MCEQ	- 2.54	2.74	1.52	.40	2.05	- .01	- .01	4.36	1.07	3.61
	MIEQ	- 5.74	- .45	-1.43	-2.60	-1.05	-3.01	-3.01	1.50	-1.93	.75
	EWIN	- 8.57	-3.30	-5.77	-6.79	-4.92	-7.23	-7.23	-3.08	-6.12	-3.86
	ESWIN	- 3.73	1.54	-1.26	-2.12	- .04	-2.54	-2.54	- .96	3.44	- .00

Note. STEQ = strict equiprobability; STPR = strict proportionality; TWIN = truth wins; TSWIN = truth supported wins; MAEQ = majority, equiprobability otherwise; MCEQ = majority if correct, equiprobability otherwise; MIEQ =

majority if incorrect, equiprobability otherwise; EWIN = error wins; ESWIN = error supported wins.

[a] $z = 1.65$, $p < .10$; $z = 1.96$, $p < .05$; $z = 3.65$, $p < .001$.